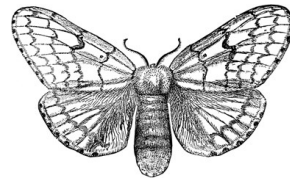


Gypsy Moth in the Town of Pelham

2019 Population Surveys and 2020 Defoliation Forecasts



Allison Craig

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BioForest

- Founded by former Canadian Forest Service rangers in 1996
- Specializing in
 - Commercial and urban forest pest management
 - Tree care product development and distribution



BioForest & Gypsy Moth

- Egg mass surveys in Southern Ontario:
 - Oakville, 2012 to present
 - Mississauga, 2013 to present
 - Hamilton, 2016 to present
 - Burlington, 2017 to present
 - Barrie, 2019
 - London, 2019
 - Sarnia, 2019
 - York Region, 2019



Gypsy Moth Services in Pelham

- November 2019
 - Contract No. 2019-PW-19: Gypsy Moth Services
- Tasks
 1. Develop gypsy moth monitoring plots
 2. Conduct gypsy moth egg mass surveys throughout the Town
 3. Technical report

Plot Development

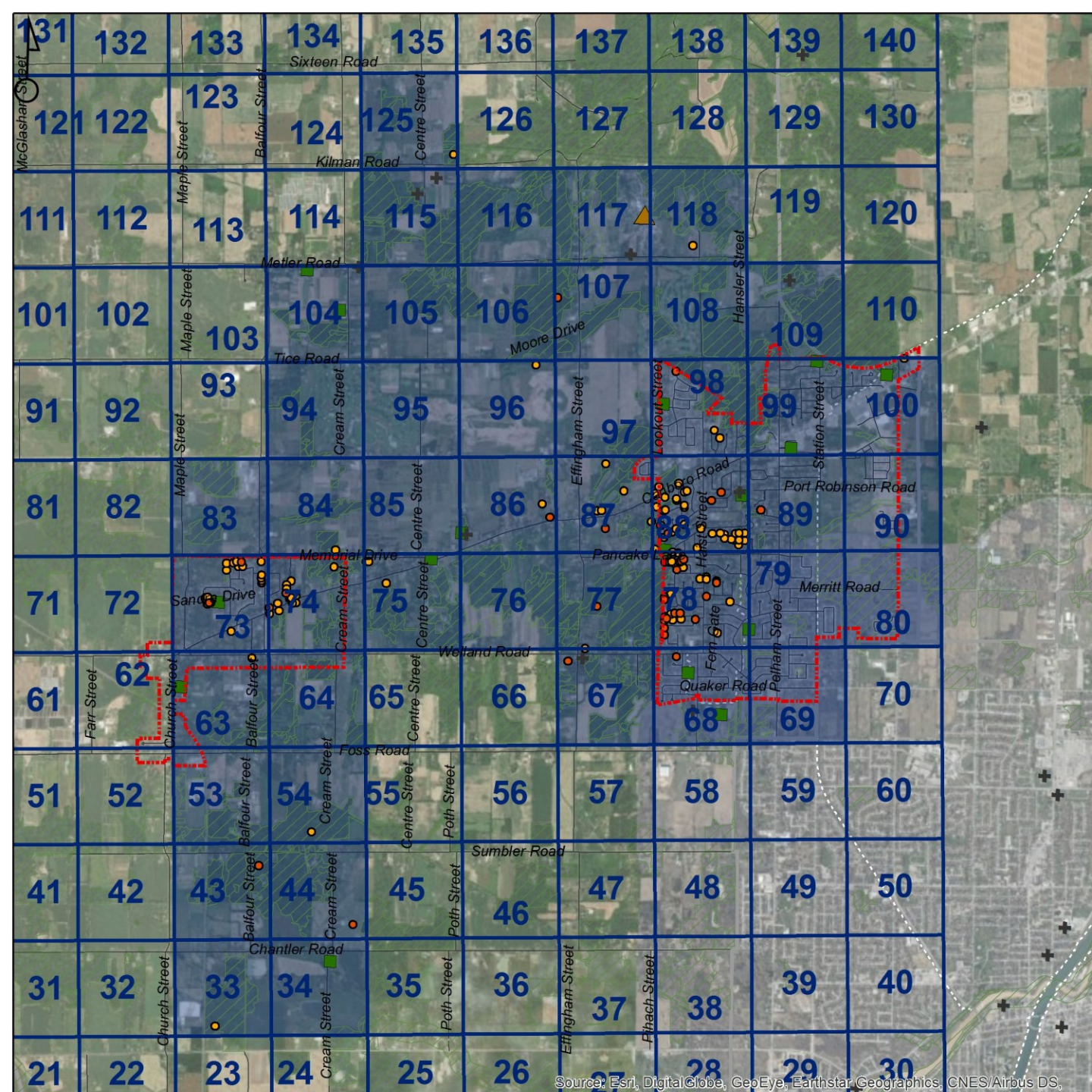
- Grid-based approach to cover a large area in a systematic way
- Prioritized survey areas based on:
 - Historical gypsy moth activity and reports
 - Connectivity through natural areas or continuous forest canopy
 - Good coverage of both urban and rural areas



2019

TOWN OF PELHAM

Gypsy Moth Monitoring Program



- Pelham Grid
- Pelham Urban Boundary
- 2019 Gypsy Moth Reports - Residential
- 2018 Gypsy Moth Reports - Residential
- Cemeteries
- Campgrounds
- 2018 Gypsy Moth Reports - Parks
- Core Natural Heritage Environmental Conservation Areas
- Pelham Grid - Selected
- Municipal Boundaries
- Roads
- Niagara Trails
- Parcel Ownership**
- Private
- Niagara Peninsular Conservation Authority
- Nature Conservancy of Canada
- Niagara Regional Municipality
- Town of Pelham
- Province of Ontario (Infrastructure)

Gypsy Moth Egg Mass Surveys

- Methodology
 - Established a total of **133 plots**
 - Five trees per plot
 - Survey focused on mature oak trees or alternative host trees representative of area (minimum 20cm DBH)
 - Apple, aspen, beech, birch, black walnut, hickory and maple
 - Entire tree examined using binoculars
 - All egg masses counted
 - Old/new egg masses tallied and measured



Gypsy Moth Egg Mass Surveys

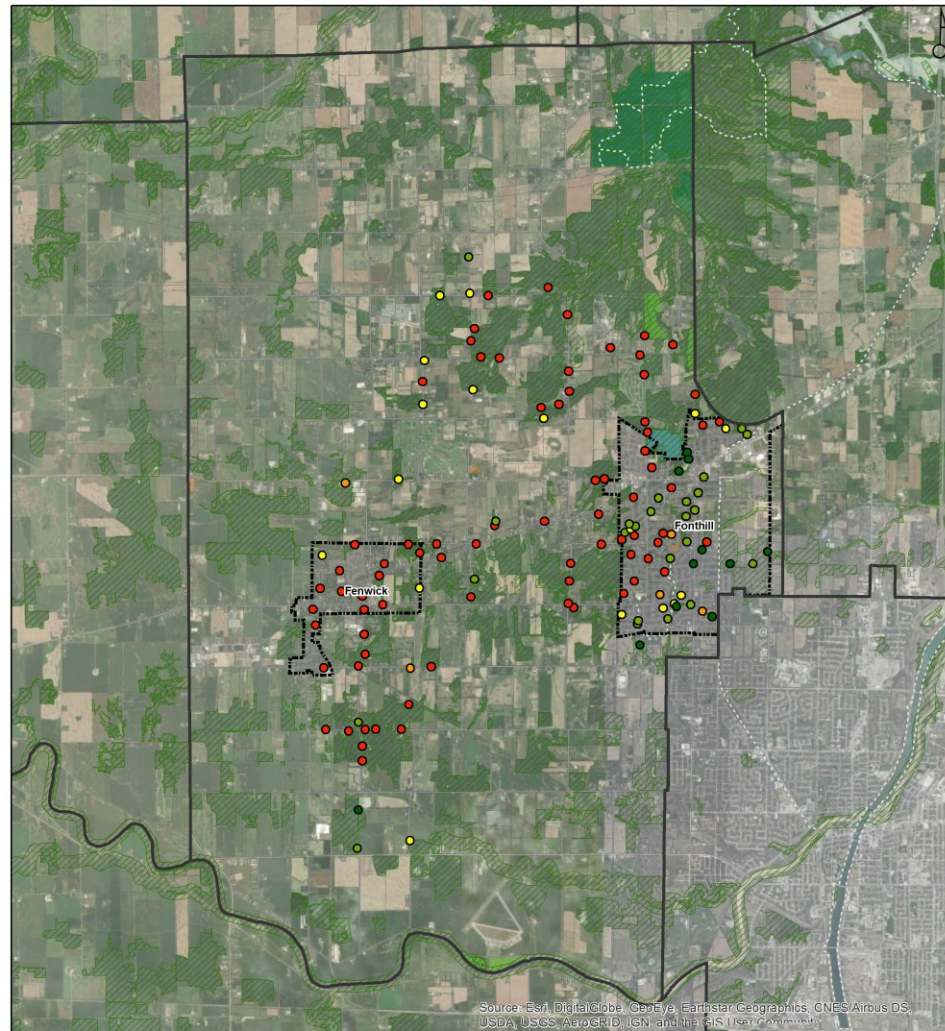
- Thresholds
 - Derived from USDA defoliation prediction model

Egg Mass Density (Egg Masses per Hectare)	Defoliation Forecast	Defoliation Forecast Range (%)	Management Impacts
0	Nil	0 to 5	None
1 to 1,250	Light	6 to 25	Up to 20% Defoliation
1,251 to 3,750	Moderate	26 to 65	Nuisance and Aesthetics; Noticeable Defoliation
3,751 to 5,000	Heavy	66 to 90	Wildlife and Recreation; Growth Loss
> 5,001	Severe	91 to 100	Tree Mortality



Results

- 2020 defoliation forecasts
 - **Severe** = 57% of plots
 - **Heavy** = 4% of plots
 - **Moderate** = 13% of plots
 - **Light** = 18% of plots
 - **No defoliation** = 8% of plots
- Areas with heaviest populations
 - Fenwick and south of Fenwick
 - Balfour Road, Foss Road, Sumbler Road
 - Along Canboro Road, Effingham Street and Pancake Lane
 - West side of Fonthill and areas north and west of Fonthill
 - Centre Street, Effingham Street, Haist Street, Kilman Road, Metler Road and Moore Drive



Source: ESA, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

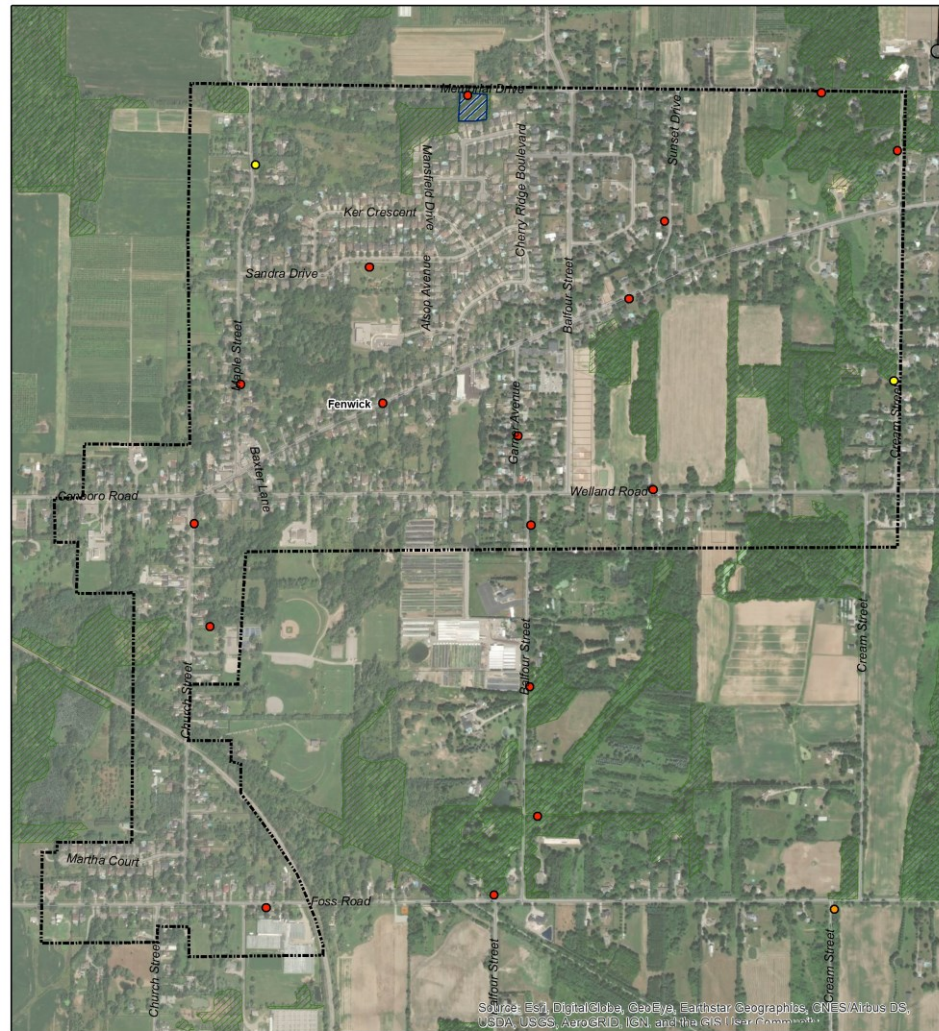
Legend  Municipal Boundaries  Pelham Urban Boundary  Core Natural Heritage Environmental Conservation Areas  Niagara Trails  Roads	Parcel Ownership  Private  Niagara Peninsular Conservation Authority  Nature Conservancy of Canada  Niagara Regional Municipality  Town of Pelham  Province of Ontario (Infrastructure)	2020 Defoliation Forecast  Nil  Light  Moderate  Heavy  Severe
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2019
Town of Pelham
 Gypsy Moth
 Egg Mass Monitoring Plots

0 0.5 1 2 3 4
 Kilometers

Fenwick

- 14 out of 16 plots within Town boundary have **Severe** defoliation forecast for 2020
- Counts ranged from 1,700 to 94,000 egg masses per hectare



Legend

- Municipal Boundaries
- Pelham Urban Boundary
- Core Natural Heritage Environmental Conservation Areas
- Niagara Trails
- Roads
- 2019 Spray Blocks

- Parcel Ownership
- Private
- Niagara Peninsula Conservation Authority
- Nature Conservancy of Canada
- Niagara Regional Municipality
- Town of Pelham
- Province of Ontario (Infrastructure)

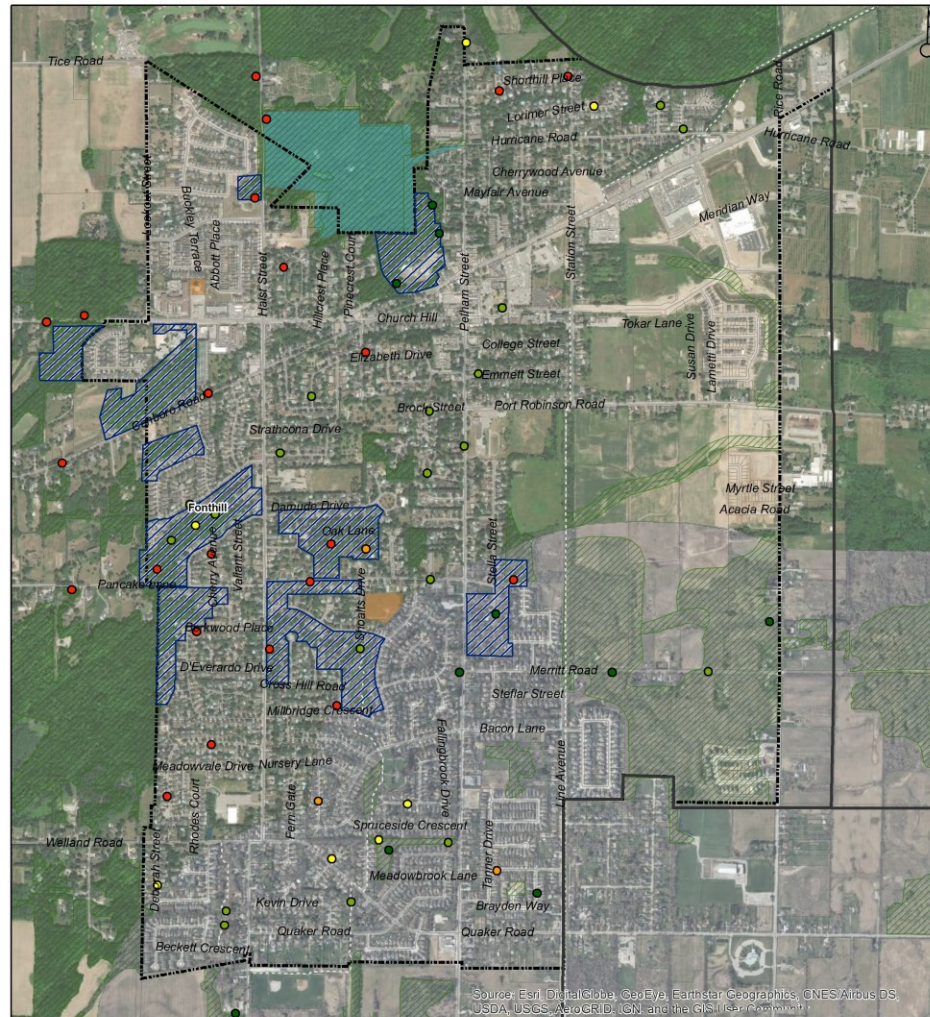
- 2020 Defoliation Forecast
- Nil
- Light
- Moderate
- Heavy
- Severe

0 0.075 0.15 0.3 0.45 0.6 Kilometers

2019
Town of Pelham
Gypsy Moth
Egg Mass Monitoring Plots

Fonthill

- 19 out of 54 plots have **Severe** or **Heavy** defoliation forecast
- Numerous plots with 0 egg masses per hectare, ranging up to 79,000



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend  Municipal Boundaries  Pelham Urban Boundary  Niagara Natural Heritage Environmental Conservation Areas  Niagara Trails  Roads  2019 Spray Blocks	Parcel Ownership  Private  Niagara Peninsula Conservation Authority  Nature Conservancy of Canada  Niagara Regional Municipality  Town of Pelham  Province of Ontario (Infrastructure)	2020 Defoliation Forecast  Nil  Light  Moderate  Heavy  Severe
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2019
Town of Pelham
 Gypsy Moth
 Egg Mass Monitoring Plots

0 0.1250.25 0.5 0.75 1
 Kilometers

Results



58% of all egg masses within reach were new



Average egg mass size = 33.5mm

84% of all new egg masses measured were large (>25mm)


OMNRF Gypsy Moth Defoliation - 2017

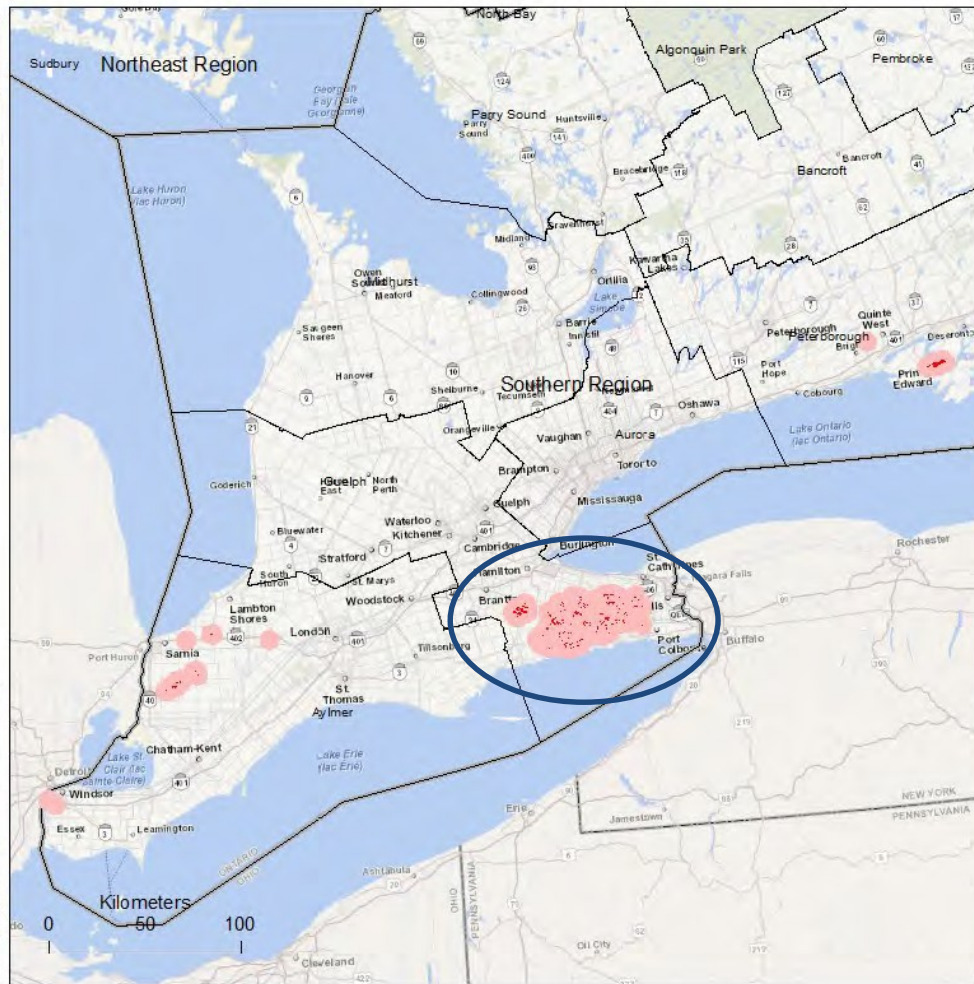


Gypsy Moth 2017

Southern Region
Areas within which gypsy
moth caused defoliation

Moderate-to-severe = 10,856 ha

 Area of moderate-to-severe
defoliation




OMNRF Gypsy Moth Defoliation - 2018

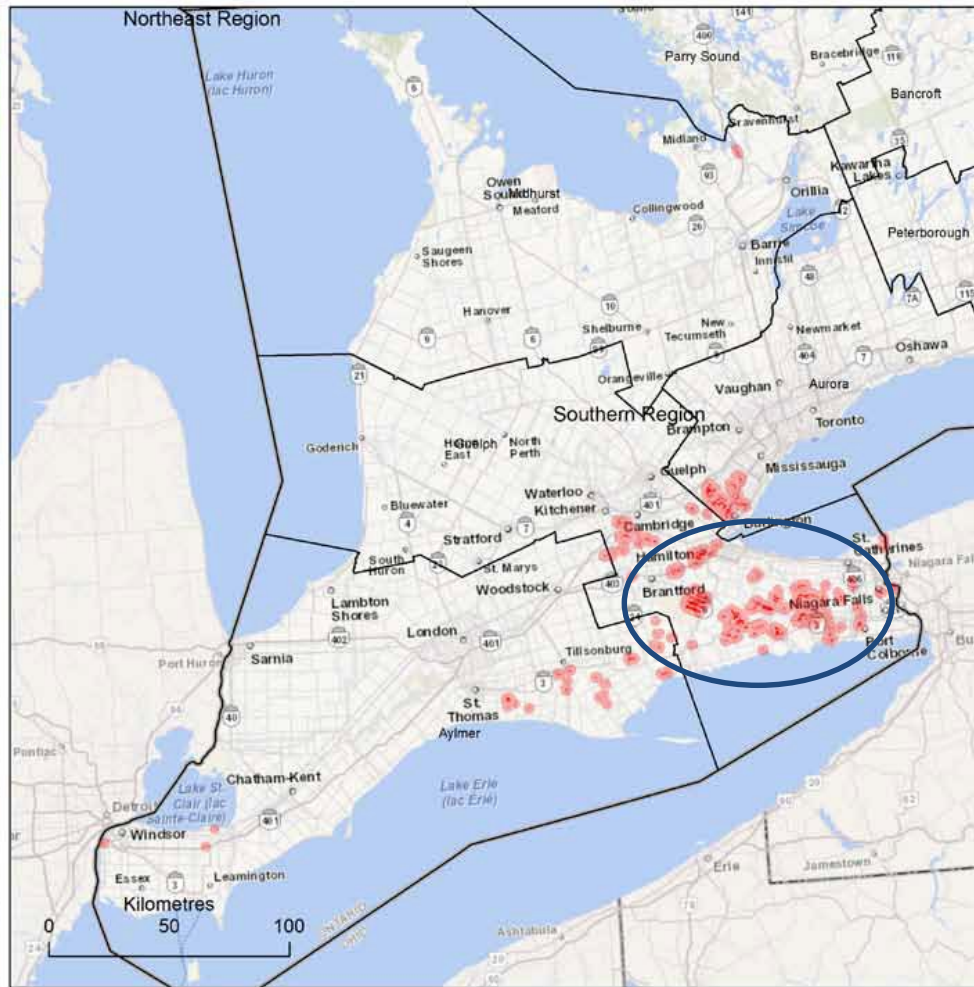


**Gypsy moth
2018**

Areas in the Southern Region
where gypsy moth caused
defoliation

Moderate to severe = 14,937 ha

 Area of moderate to severe
defoliation



OMNRF Gypsy Moth Defoliation - 2019

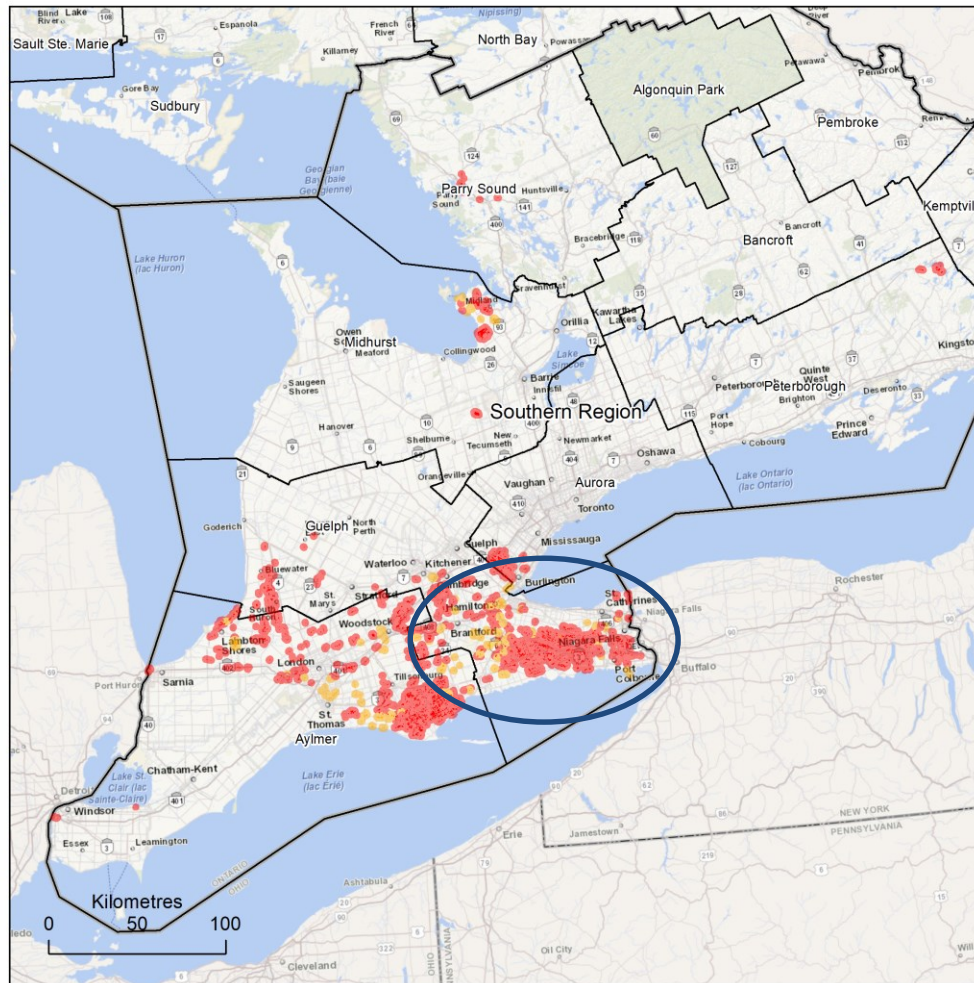


Gypsy moth 2019

Areas in the Southern Region
where gypsy moth caused
defoliation

Light = 4,046 ha
Moderate to severe = 43,064 ha

- Area of light defoliation
- Area of moderate to severe defoliation



Management Options

1. Town takes no action on public trees. Implements a strong communications and outreach program to educate residents and encourage private landowners to undertake treatment.
2. Town implements a treatment program targeted at urban areas and adjacent forested properties with plots exceeding the 2,500 egg mass/hectare threshold. Supported by a strong communications program for private landowners not included in treatment areas.
3. Town implements comprehensive treatment program including all urban and rural areas with plots exceeding the 2,500 egg mass/hectare threshold.

For all options, communication is KEY

Considerations

- Healthy natural forests are resilient
- Confluence of stressors on urban trees
 - Previous defoliation
 - Soil compaction, poor sites/nutrients, high salinity
 - Drought, storm events (wind, ice)
 - Construction, line clearing
 - Other pests – cankerworm (increased susceptibility)
- Importance of protecting valuable natural assets – street trees, parks, etc.
 - Aesthetic, recreation, economic, environmental



Thank you!

